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BEFORE THE BOARD OF PATENT APPEALS
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Appellant(s): A.P. Shepherd et al.

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BOARD OF PATENT APPEALS
AND INTERFERENCES

Kevin L. Daffer
For Appellant

92-0991

EXAMINER'S ANSWER

This is in response to appellant's brief on appeal filed 29 July 1991.

(1) *Status of claims.*

The statement of the status of claims contained in the brief is correct.

(2) *Status of Amendments After Final.*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(3) *Summary of invention.*

The summary of invention contained in the brief is correct.

(4) *Issues.*

The appellant's statement of the issues in the brief is correct.

(5) *Grouping of claims.*

Appellant's brief includes a statement that claims 1 and 8-12 do not stand or fall together and provides reasons as set forth in 37 C.F.R. § 1.192(c)(5) and (c)(6).

(6) *Claims appealed.*

The copy of the appealed claims contained in the Appendix to the brief is correct.

(7) *Prior Art of record.*

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

Anderson et al, "Light absorbing and Scattering Properties of Non-Haemolysed Blood" <u>Phys</u>. <u>Med</u>. <u>Biol</u>. vol. 12, (1967) pp. 173-184.

4,134,678	Brown et al	16 January 1979
3,516,7~~43~~ 46	Shibata et al	23 June 1970

(8) *New prior art.*

No new prior art has been applied in this examiner's answer.

(9) *Grounds of rejection.*

The following ground(s) of rejection are applicable to the appealed claims.

A statement of the rejection can be found in the final rejection, paper no. 8, mailed 27 September 1990.

(10) *New ground of rejection.*

This Examiner's Answer does not contain any new ground of rejection.

(11) *Response to argument.*

It appears that a primary argument of the brief on appeal is that the art does not teach "generating a plurality of radiation frequencies each determined ... to minimize the effect of radiation scattering". This argument is set forth on pages 12 through 15 of the brief. The brief an appeal states, on the bottom of page 14, that "Anderson merely suggests minimizing scattering at wavelengths with high extinction coefficients", which is at least clearly suggestive of minimizing scattering and maximizing absorbance (i.e., exhibiting high extinction) of instant claim 1. Further, the argued method of selecting wavelengths to minimize scattering and maximizing absorbance does not in fact differ interms of the resulting wavelengths chosen from the prior art method of choosing which wavelengths to use. On the top of page 7 of the instant specification particular wavelengths which are used in accordance with the instant invention are set forth. These wavelengths are in the general range of wavelengths which has been used by others in the past for testing blood constituents. Anderson, on page 179, discusses wavelengths of 505, 520, 530 and 560 nanometers. The specification, page 7 discloses wavelengths which "minimize the effect of radiation scattering and maximize radiation absorbance by whole, undeluted blood" within the disclosed scope of the invention; among those wavelengths is 506, 520, 535 and 560

nanometers. Two of the wavelengths are identical to that taught by Anderson (520 and 560 nanometers), one differs by only one nanometer (506 as opposed to 550 nanometers) and the remainder is close (535 rather than 530nm).

The Brown et al reference, in column 3, lines 29-39 teaches for the determination of four hemoglobin species four wavelengths which can be used are 535.0, 585.2, 594.5 and 626.6nm, which correspond exactly within the reported precision of the numbers, to the set of ~~353~~ 535, 585, 595 and 627nm disclosed in page 7, line 6 of the instant specification as being a set within the intended scope of the invention. Appellant may not claim as being new and unobvious choosing exactly the same wavelengths as are chosen in the prior art by "dressing up" the claim with proposed criteria for selection that the references do not explicitly set forth but make no difference in the actual choices of wavelengths which are made. A method which, as in this case, in practice reduces down to "generating a plurality of radiation frequencies each determined to distinguish one said constituent component from another said constituent component as explicitly taught by Brown et al, column 3, line 33 for that purpose" is neither new nor unobvious, no matter how it is dressed up in other words.

On pages 13 and 14 of the brief there is an argument which is not understood. The brief argues that three wavelengths (506, 520 and 560nm) "would not produce satisfactory results in

Anderson but would prove satisfactory in the present intention. In particular, Anderson shows at least two of these three wavelengths as having a significant scattering effect which causes their non-linearity. Conversely, these three wavelengths are chosen in the present invention as having minimal scattering effects" (the passage bridging pages 13 and 14). This is inconsistent and self-contradictory. In both cases whole nonhaenolysed blood is used; it cannot be that the same wavelength of light is significantly scattered for Anderson and minimally scattered for Appellant; the laws of physics governing the scattering of light do not change according to whether one has in mind the teachings of Anderson or those of the instant application. It would appear that what is in fact the case here is that Appellant is willing to accept as "minimal" scattering a degree of nonlinearity based upon scattering which can be measured by Anderson. It is manifestly unreasonable to assume that the actual degree of scattering and actual non-linearity based upon that scattering is different between what happens when Anderson, or one who is following the teachings of Anderson irradiates whole blood with light of these wavelengths and what happens when Appellant, or one who is following the teachings of the instant application, irradiates the same whole blood with the same wavelength of light. There is no difference in structure in claim 1, nor has Appellant argued any difference in structure in

claim 1, from that of Anderson which would produce different scattering effects.

The second primary argument in the brief relative to claim 1 appears to be that the Anderson and Brown can not be properly combined; this argument is found on pages 15 through 19.

The argument is based in part on the allegation that Anderson deals only with whole blood while Brown uses only diluted haemolysed blood, and the allegation that the neither contains any suggestion that one has any relevance to the other. Neither is correct.

Anderson, on pages 178 and 179, in section 3.3 and Fig. 4, show that the relationship between the absorbance (optical density) of non-haemolysed blood and haemalysed blood is a straight line for wavelengths at least from 520 to 620nm. This is a direct teaching of the relevance of the teachings of Anderson of using non-haemolysed blood to known tests using haemolysed blood and _vice versa_. Further, Anderson, on page 183, explicitly states that "the linear relationship postulated by Beer's Law between optical density and the extinction coefficient of haemoglobin is valid for haemoglobin even when contained within scattering particles". In the introduction, on pages 173 and 174, there is a general discussion of the prior art and the recognized relationship therein between measurements of haemolysed and non-haemolysed blood and that the purpose of the

disclosure of Anderson is to "evaluate separately the amount of light absorbed and the amount scattered" by non-haemolysed blood. No one giving the Anderson reference a fair reading could fail to discern within that reference at least a clear suggestion of the equivalence of the measuring technique of Anderson and prior techniques using haemolysed blood for measuring optical absorbances of blood constituents.

The brief, on page 14, states "Anderson makes no mention or even suggests that the wavelengths be chosen to distinguish constituent components" (middle of page 14 of the brief). This is not correct. Anderson continually relates the arrangement to "conventional spectrophotometric techniques" (see page 174, line 13; page 175, immediately after equation (4); page 182 first sentence of section 4.2; and the sentence bridging pages 182 and 183) and teaches, in the abstract, that "the absorption of light within the erthroyte is the same as in a haemoglobin solution".

As such "conventional spectro photometric techniques" do choose the wavelengths to distinguish constituent components (see Brown as an example), it is clear Anderson at least clearly suggests such choosing of wavelengths.

Anderson also explicitly discusses determining oxygen saturation of the blood (see the paragraph bridging pages 182 and 183). As oxyhemoglobin is one of the constituents discussed by Brown (column 3, line 37), it is at least obvious for one reading

Anderson to choose a wavelength which can distinguish the constituent component taught by Anderson to be distinguished.

As Anderson teaches that the basic disclosed arrangement is able to make the same absorption measurements on whole non-haemolysed blood, it would have been obvious to make the same tests as taught by Brown et al, using the same wavelengths as taught by Brown, for the purpose of determining constituents as taught Brown and a suggested by Anderson both by the disclosed connection to "conventional spectrophotometric techniques" and by the determination of oxygen saturation, which is a determination of a "constituent component" of the blood, using wavelengths which are disclosed by Anderson as being in the region when the relationship between measurements on haemolysed and non-haemolysed blood is linear.

As to the Brown reference it is noted that Brown discloses the measurement of "whole blood"; see the abstract, third line; column 2, lines 22 and 28; column 10, line 9; column 11, line 39; and column 13, lines 27, 42 and 45. See also claim 9, line 3; claim 11, line 2; and claim 14, line 2. Instant claim 1 also calls for measuring "whole blood". Thus much of the argued distinction between the blood tested by Brown and that of the instant claims is in fact not present in the instant claims; both measure "whole blood"; Brown not only suggests, but teaches and claims using "whole blood".

On the bottom of page 17, the brief argues that "Brown does not teach or suggest that the wavelengths used in its device be chosen having high extinction coefficients". As Brown teaches using exactly the same wavelengths as disclosed by the instant specification as meeting the instant claimed subject matter of high extinction coefficients, this is manifestly untrue. It is clearly incorrect to argue that these wavelengths have high extinction coefficients for Appellant and not for Brown or Anderson; the laws of physics do not change. Brown most certainly does not "specifically avoid selecting wavelengths according to Anderson data"; Brown does not mention the Anderson data and clearly does not "specifically avoid" using it. Brown uses wavelengths three of which are within the disclosed linear relationship between haemolysed blood and non-haemolysed blood of Anderson (section 3.3) and the fourth (626.6nm) in just outside the disclosed range (which goes to 620nm). Thus it is clear that Brown is consistent with the teachings of Anderson in using wavelengths generally taught by Anderson as being useful both with the non-haemolysed blood of Anderson and the haemolysed blood of "conventional" techniques and generally within the teachings of Anderson as being within the range in which equivalence between the two methods is explicitly disclosed; i.e., where the relationship is linear.

The choices of how the wavelengths of choice are generated are set forth in instant claims 6 through 10. Each is a known method for generating light; white light sources (claims 6, 9 and 10) are known in the art, as are tunable lasers and light-emitting diodes. Appellant is not the first and original inventor of any of these known, commercially available light sources, nor the first to realize that they are light sources that can be used to provide light. Interference filters (claims 6 and 8) are well-known for the purpose of taking a wider band of light wavelengths and filtering a narrower band for use in optical tests, Brown, for example, discloses interference filters for this purpose (column 2, lines 40-41). A diffraction grating is a standard well-known device for selecting wavelengths of interest. A monochromator is by definition a device which takes white or other broadbard light and produces a narrow band monochromatic light output; the spectrophotometer of Anderson clearly contains monochrometer, since the scanning of the wavelengths taught in the last paragraph of page 178 would normally be obtained with a monochrometer. Monochrometers are generally constructed with diffraction gratings as their means of separating light of different frequencies. The specification mentions these various light source arrangements only in passing with only a casual mention to each (see the paragraph bridging pages 7 and 8 of the instant specification). The specification

never discloses how to actually make or use any of these light source arrangements. If those of ordinary skill in the art to not know, apart from and prior to this disclosure, what monochromator is and how to obtain and use one, or how a controllable diffraction grating can be arranged to produce the selected measuring frequencies then the instant disclosure is manifestly insufficient as regards to these claims. It is believed that all these systems are in fact well-known and that therefore the disclosure is sufficient; nothing in therefore the disclosure is sufficient; nothing in the record appears to be an actual allegation that any of these arrangements are in fact not previously known in the art.

As for claims 11 and 12 Brown teaches using four frequencies to measure four components (see column 3, lines 33-39). Anderson mentions that the absorption is in accordance with the Beer-Lanbert with the arrangement disclosed therein; see the second sentence of the first full paragraph on page 183. Brown et al also discloses that Beer's law of absorption is the basis for the analysis disclosed therein (column 3, line 4).

The brief argues that the Shibata reference deals with a non-analogous art. This is not correct. In Shibata, as in Anderson, there is a specific disclosed problem in on optical absorption test in which particles in the being tested cause scattering. This is problem is solved by placing the cell close

to the detector with the area of the detector being large enough so that "the photosensitive surface thereof can capture substantially all the light transmitted through the cell 3', both parallel and diffused" (column 3, lines 26-28) thus removing the unwanted effect of last scattered light. This is the same situation, with the same problem and the same basic solution as proposed by Anderson; the integrating sphere of Anderson, like the arrangement of Shibata et al addresses the problem of unwanted loss of scattered light by selecting an detector arrangement which detects not only the directly transmitted light but the scattered light as well. Thus the two are closely analogous.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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EXAMINER
ART UNIT 255

Rosenberger/EW
October 11, 1991